Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A solid state device comprising a p-n junction containing a p-type group II-VI semiconductor material and an n-type semiconductor material, wherein the p-type group II-VI semiconductor comprises a single crystal thin film of a group II-VI semiconductor comprising atoms of group II elements and atoms of group VI elements, wherein the group II-VI semiconductor is doped with one or more p-type dopants selected from nitrogen, phosphorus, arsenic, antimony, bismuth, copper, and chalcogenides of the foregoing, and mixtures thereof, wherein the p-type dopant concentration in the group II-VI semiconductor is greater than about 10^{16} atoms·cm^{-3}, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 cm^2/V·s, and wherein the p-type group II-VI semiconductor material has a luminescent peak at about 3.357 eV.

2. (original) A solid state device according to claim 1, wherein the group II elements are selected from zinc, cadmium, alkaline earth metals, and mixtures thereof.

3. (original) A solid state device according to claim 1, wherein the group VI elements are selected from oxygen, sulfur, selenium, tellurium, and mixtures thereof.

4. (cancelled).

5. (original) A solid state device according to claim 1, wherein the p-type dopant is phosphorus.

6. (original) A solid state device according to claim 1, wherein the p-type dopant is arsenic.

7. (original) A solid state device according to claim 1, wherein the p-type dopant is antimony.

8. (original) A solid state device according to claim 1, wherein the p-type dopant is bismuth.

9. (cancelled).

10. (cancelled).

11. (original) A solid state device according to claim 1, wherein the thin film of a group II-VI semiconductor is deposited by a chemical deposition process selected from RF sputtering, CVD (chemical vapor deposition), MOCVD (metal organic chemical vapor deposition), spin coating, electrophoresis, and hydrothermal growth processes.

12. (original) A solid state device according to claim 1, wherein the group II-VI semiconductor material is zinc oxide.

13. (original) A solid state device according to claim 1, wherein the group II-VI semiconductor material is zinc sulfide.

14. (original) A solid state device according to claim 1, wherein the device is a light emitting diode.

15. (original) A solid state device according to claim 1, wherein the device is a laser diode.

16. (original) A solid state device according to claim 1, wherein the device is a field effect transistor.

17. (original) A solid state device according to claim 1, wherein the device is a photodetector.

18. (original) A solid state device according to claim 1, wherein the device emits light at a wavelength in the range from about 207 nm to 810 nm.

19. (original) A solid state device according to claim 1, wherein the device emits light at a wavelength of about 441.6 nm.

20. (original) A solid state device according to claim 1, wherein the device emits light at a wavelength of about 325 nm.

21. (original) A solid state device according to claim 1, wherein the group II-VI semiconductor material is disposed on an amorphous self supporting substrate surface.

22. (original) A solid state device according to claim 1, wherein the n-type semiconductor material is an n-type group II-VI semiconductor.

23. (currently amended) A solid state device comprising a p-n junction containing a p-type zinc oxide and an n-type semiconductor material, wherein the p-type zinc oxide comprises

single crystal zinc oxide that is doped with one or more p-type dopants, wherein the p-type dopant concentration in the zinc oxide is greater than about 10^{16} atoms·cm^{-3}, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 $cm^2/V \cdot s$, and wherein the p-type zinc oxide semiconductor material has a luminescent peak at about 3.357 eV.

24. (original) A solid state device according to claim 23, wherein the p-type dopant is phosphorus.

25. (original) A solid state device according to claim 23, wherein the p-type dopant is arsenic.

26. (original) A solid state device according to claim 23, wherein the p-type dopant is antimony.

27. (original) A solid state device according to claim 23, wherein the p-type dopant is bismuth.

28. (original) A solid state device according to claim 23, wherein the p-type dopant is copper.

29. (original) A solid state device according to claim 23, wherein the single crystal zinc oxide further comprises magnesium oxide.

30. (original) A solid state device according to claim 23, wherein the single crystal zinc oxide further comprises cadmium oxide.

31. (original) A solid state device according to claim 23, wherein the n-type semiconductor material is an n-type zinc oxide.

32. (original) A solid state device according to claim 31, wherein the n-type zinc oxide contains an n-type dopant selected from ions of Al, Ga, B, H, Yb and other rare earth elements, Y, Sc, and mixtures thereof.

33. (original) A solid state device according to claim 23, wherein the device is a light emitting diode.

34. (original) A solid state device according to claim 23, wherein the device is a laser diode.

35. (original) A solid state device according to claim 23, wherein the device is a field effect transistor.

36. (original) A solid state device according to claim 23, wherein the device is a photodetector.

37. (original) A solid state device according to claim 23, wherein the device emits light at a wavelength in the range from about 310 nm to 660 nm.

38. (original) A solid state device according to claim 23, wherein the device emits light at a wavelength of about 441.6 nm.

39. (original) A solid state device according to claim 23, wherein the device emits light at a wavelength of about 325 nm.

40. (original) A solid state device according to claim 23, wherein the single crystal zinc oxide is disposed on an amorphous self supporting substrate surface.

41. (currently amended) A solid state device according to claim ~~23~~ 40, further comprising a barrier layer disposed between the single crystal zinc oxide and the amorphous self supporting substrate surface.

42. (New) A solid state device comprising a p-n junction containing a p-type zinc oxide and an n-type semiconductor material, wherein the p-type zinc oxide comprises single crystal zinc oxide that is doped with a quantity of phosphorous, wherein the phosphorous dopant concentration in the zinc oxide is greater than about 10^{16} atoms·cm^{-3}, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 $cm^2/V \cdot s$, and wherein the p-type zinc oxide semiconductor material has a luminescent peak at about 3.357 eV

43. (New) A solid state device according to claim 42, wherein the p-type zinc oxide further comprises magnesium oxide.

44. (New) A solid state device according to claim 42, wherein the p-type zinc oxide further comprises cadmium oxide.